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A Descriptive Analysis
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New Mexico Forest Products Industry: A Descriptive Analysis 1997

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INTRODUCTION

This report summarizes the results of a statewide census of New Mexico's primary forest products industry for calendar year 1997. Its principal focus is to determine the utilization of New Mexico's timber harvest, the type and number of forest products firms operating in 1997, their sources of raw material, and outputs of finished products, with comparisons to previous years. The impacts of trends and changes affecting the industry are also discussed.

The University of Montana's (Missoula, Montana) Bureau of Business and Economic Research (BBER) and the USDA Forest Service Rocky Mountain Research Station's Inventory Monitoring and Evaluation Program (Ogden, Utah) cooperated in the analysis and preparation of this report. The cooperators have developed a system to collect, compile, and make available state and county information on the operations of the forest products industry -- the Forest Industries Data Collection System (FIDACS).

FIDACS is based on a census of primary forest product manufacturers located in a given state. Primary forest product manufacturers are firms that process timber into manufactured products such as lumber, and facilities like particleboard plants, that use the wood fiber residue directly from timber processors. Through a written questionnaire or phone interview, manufacturers provided the following detailed information for each plant for a given calendar year:

- Plant production capacity and employment
- Volume of raw material received, by county and ownership
- Species of timber received
- Finished product volumes, types, sales value, and market locations
- Utilization and marketing of manufacturing residue

New Mexico manufacturers were identified through national forest bidders' lists, telephone directories, the Directories of the Forest Products Industry (Miller Freeman Inc., 1998), and information provided by industry and land management agency personnel.

This effort is the first complete application of FIDACS in New Mexico. The BBER has conducted similar censuses in Montana for 1976, 1981, 1988, and 1993; in Idaho for 1979, 1985, 1990, and 1995; and in Wyoming, Utah and Arizona for 1976, 1992 and 1995, respectively. The Rocky Mountain Research Station has collected similar, but more limited data in New Mexico for 1966, 1969, 1974 and 1986, and from other Rocky Mountain states for other years.

Firms cooperating in the 1997 New Mexico census processed virtually all of the state's commercial timber harvest. Published sources and information provided by federal, state, and industry resource managers were used to estimate the production and sales of the few non-respondent mills. These non-respondent mills accounted for less than one percent of the timber processed in the state. New Mexico timber processed by out-of-state firms was determined through surveys of mills in adjacent states.

Information collected through FIDACS is stored at the University of Montana's Bureau of Business and Economic Research. Additional information is available by request. Individual firm-level data is confidential and will not be released.

TRENDS IN TIMBER HARVEST

Following World War II, with strong housing markets and public policy encouraging timber production on national forests, timber harvest for industrial products in New Mexico increased from under 150 million board feet (MMBF) Scribner annually to a peak of approximately 300 MMBF in the late 1960's (Figure 1). Harvest dropped somewhat from this peak in the 1970's and 1980's with the late 1980's averaging about 190 MMBF annually.

Since the late 1980's New Mexico's timber harvest has declined dramatically, caused largely by decreases in the harvest from national forests (Figure 2). New Mexico's national forest timber harvest has followed a pattern similar to that of many western states: harvest levels on national forest lands declined in the early 1990's, brought on by a combination of pressures related to threatened and endangered species, appeals and litigation directed at federal timber sales, and federal budget levels (Keegan *et al.*, 1995a and 1997; Warren, 1998). In New Mexico particularly, the listing of the Mexican spotted owl had a profound downward impact on national forest timber harvest levels.

The Mexican spotted owl was listed as threatened by the U.S. Fish and Wildlife Service in March of 1993. In August of 1995, a federal judge enjoined the logging of new timber sales on national forests in Arizona and New Mexico, pending development of a recovery plan for the owl (Silver *et al.* v. Thomas *et al.*, 1995). This injunction remained in place until December of 1996.

As recently as 1989, 136 million of the 210 million board feet of timber was harvested annually from national forest lands in New Mexico, accounting for about two-

thirds of the timber processed by New Mexico's timber industry (Western Wood Products Association, 1991). Fiscal year 1996 saw the harvest from New Mexico national forests fall to less than 20 MMBF (Figure 2), some of which was firewood, during the pendency of the injunction. The lifting of the injunction resulted in some increase in national forest timber offerings in fiscal years 1997 and 1998 (October 1996 through September 1997). The cut from New Mexico national forests increased slightly to 23 MMBF in 1997, and 30 MMBF in 1998; however, private and tribal lands contributed 87 percent of the 1997 harvest. Currently, litigation and appeals, the added complexity in developing timber sale projects to protect habitat for the owl and other threatened and sensitive species have limited offerings from the national forests. Also, the region's sawmill industry was designed to process larger diameter timber, a change in the size of timber offered with many of the new sales composed of smaller timber, coupled with the loss of industry infrastructure has made it more difficult to sell some sales.

The harvest from private and tribal lands has increased somewhat but not enough to offset the reduction in timber cut from national forest lands. Consequently, total harvest for industrial products in New Mexico dropped from about 200 MMBF from all ownerships in the late 1980's to a low of 61 MMBF in 1996 and under 100 MMBF in 1997 (Figure 1). As discussed later in this report, the reduced harvest from national forest lands has powerfully impacted the New Mexico wood products industry. Since 1986, New Mexico's timber processing capacity, output, and value of products have all been reduced substantially although at the same time there has been some diversification of the industry.

STRUCTURE AND DISTRIBUTION OF NEW MEXICO'S FOREST PRODUCTS INDUSTRY

In 1997, timber-processing facilities operated in twelve of New Mexico's thirty-three counties and produced an array of products including:

- lumber and other sawn products, particleboard,
- structural beams for the native Pueblo's adobe homes (vigas) and cross members (latillas),
- decorative bark,
- house logs and log homes,
- posts and poles,
- and mesquite barbecue chips.

These facilities tend to be located near the resource in north central New Mexico (Figure 3).

The decline in federal timber availability has lead to mill closures, reduced sales value, lumber production, capacity, and capacity utilization, but surprisingly, the number of facilities has increased slightly in the last decade while the kinds of products produced by New Mexico's forest products industry has become more diversified. In 1997, there were an estimated 44 primary forest products plants in New Mexico, not much change from the approximately 41 - 46 operating in 1986 (Table 1). The number of sawmills did decline from 26 at the time of the last census in 1986 to 22 in 1997, but the number of facilities manufacturing vigas increased from an estimated 5 -10 in 1986 to 15 in 1997. The number of other producers was reduced from ten to seven.

Sales Value of Primary Wood Products

The 1997 estimated sales value of New Mexico's primary forest products was \$77.7 million free on board (f.o.b.) the producing mill (Table 2). Expressed in constant 1997 dollars, this is less than half the estimated sales of \$168 million in 1986. Reduced lumber and reconstituted board (particleboard and medium density fiber board) production accounted for the decline, with lumber sales falling \$50 million from \$92.9 million in 1986 to \$42.9 million in 1997 and reconstituted board products down \$49 million. The declines in both lumber and reconstituted board sales stemmed from production decreases resulting from New Mexico mill closures and curtailments.

Production of vigas and latillas has grown considerably since 1986, with the value of production nearly tripling from an estimated \$3.6 million in 1986 (constant 1997 dollars) and 3 percent of sales, to \$10.15 million and 13 percent of sales in 1997. Inflation adjusted sales value of other primary products remained approximately the same at \$4.5 million in 1986 and \$4.6 million in 1997.

Major Processing Sectors

The following sections provide detail on the individual product sectors: sawmills, particleboard and medium density fiberboard mills, viga and latilla makers, and other primary manufacturers.

Sawmills

New Mexico's 22 sawmills produced about 100 MMBF of lumber and other sawn products in 1997, a 21 percent increase from 1996, the lowest production level in recent history (Figure 4) (Western Wood Products Association, various years). However, with

timber supply driven declines in the sawmill industry, New Mexico sawmills annual production in each of the three years 1995, 1996, and 1997 represents the smallest volumes in the last 50 years (Figure 4). The highest lumber production for New Mexico's industry was in 1968 when the state's sawmills produced about 321 MMBF of lumber. This corresponds to the period of highest harvest in the state (Figure 1).

Similarly, the inflation-adjusted lumber sales for recent years are the lowest on record (Figure 5). Expressed in 1997 dollars, New Mexico lumber sales peaked in 1978 at \$171 million. Lumber sales totaled \$93 million in 1986, dropping to \$31 million in 1996 before rebounding slightly to about \$43 million in 1997. The total sales value for the 1995 - 1997 period is one-half the average lumber sales from New Mexico mills for the previous decade and only about one-third the inflation adjusted sales since 1967 when the Western Wood Products Association began reporting annual sales.

The national forest harvest reduction in New Mexico has lead to closures of a number of the state's larger sawmills and substantial reductions in operating levels at others. In addition to the reduced statewide lumber production and sales value figure discussed earlier, there has been a reversal of a twenty-five year trend of increased output of lumber per mill (Table 3). Comparing 1986 to 1997, lumber output per sawmill fell from 9.2 MMBF of lumber to 4.9 MMBF. Earlier studies showed that New Mexico's sawmills averaged 4.1 MMBF in 1966 and 1.9 MMBF in 1960.

Reduced output per mill resulted from the fact that with greatly diminished timber availability all of New Mexico sawmills operated a single shift or less in 1997. Major sawmills in the Rocky Mountain Region – including those in New Mexico – are designed and in the recent past have run at least two shifts per day for about a 240 day operating

year (Miller Freeman, 1998; Keegan *et al.*, 1995a; Keegan *et al.*, 1997; Keegan *et al.*, 1995b). In 1986, the state's six largest sawmills which accounted for the majority of the state's lumber output were operating two eight-hour shifts (McLain, 1989). In 1997, none of the mills in the state had sufficient quantities of logs to utilize multiple shift efficiencies.

Despite the decline of average lumber output per mill, production in the last decade was actually more concentrated in the state's larger mills. In 1997, the four sawmills individually producing more than 10 MMBF annually accounted for 90 percent of New Mexico's lumber production (Table 4). These four sawmills produced an average of 24.6 MMBF each in 1997 (Table 5). In 1986, the nine sawmills producing more than 10 MMBF accounted for 88 percent of the total state production, up from 62 percent produced in 1966 by the six mills with production exceeding 10 MMBF each.

On average, New Mexico sawmills produced approximately 1.30 board feet of lumber for every board foot Scribner of timber processed, for an average overrun of 30 percent in 1997. Lumber recovery varied greatly among mill types with higher overrun in sawmills producing primarily random length dimension and stud lumber, and lower overrun in mills producing primarily board lumber.

Particleboard and Medium Density Fiberboard Mills

Based on published sales, the states single remaining reconstituted board plant – a particleboard plant -- represent New Mexico's second largest primary wood product sector in 1997. The particleboard plant which utilizes wood fiber residue from lumber production in the form of planer shavings as its primary raw material had reported value of production in 1997 of \$20 million (Miller Freeman, 1998).

In 1986, there were two particleboard plants and a medium density fiberboard plant operating in New Mexico. Based on industry directories and discussions with former plant managers, particleboard production in 1986 totaled approximately 75 million sq. ft. $\frac{3}{4}$ " basis with a sales value of \$33 million expressed in 1997 dollars. Medium density fiberboard production was about 85 million square feet with sales value expressed in 1997 dollars of \$36 million. One of the two particleboard plants was closed in the early 1990s and remains idle. The lone medium density fiberboard plant was closed in 1996, subsequently sold and dismantled.

Viga and Latilla Makers

Vigas are logs stripped of their bark and used for structural roof supports in the traditional southwestern adobe structure. The typical viga is 10 to 40 feet long and 8 to 14 inches in top diameter. However, some may be manufactured up to 20 inches in diameter for special applications. Latillas are 1 to 2 inch diameter sticks, 4 to 10 feet long, which are laid across the top of the vigas as the ceiling material.

Prior to 1980 the organized manufacture of vigas and latillas was centered in the Rio Grande valley of northern New Mexico and the Silver City area of southwestern New Mexico. Early organized production was a small-scale handwork industry relying upon a drawknife to produce the finished product. While vigas are still manufactured by hand peeling, in the early 1980's some manufacturers began to mechanically debark the viga logs and use a lathe to shape the finished product.

Increased interest in this traditional style of construction and the shift of some producers to machined vigas has lead to considerable expansion in the last decade. At the time of the 1986 industry census there were five to ten plants with an estimated

production of 400,000 lineal feet of vigas and latillas annually. The 1997 census identified 15 mills producing nearly 2.2 million lineal feet of vigas. Estimated sales value in constant 1997 dollars increased from under \$4 million in 1986 to over \$10 million in 1997. In addition to the plants manufacturing vigas, both the 1986 and 1997 estimates of output and sales include the output from numerous, part-time hand producers.

Other Primary Manufactures

The census identified six additional primary wood processing facilities - two house log, two post and pole, and two decorative bark plants. The log home plants produce not just house logs but shells and kits for log homes, the two post and pole plants produce primarily fence posts and rails, and the bark operations produce decorative landscape bark, animal bedding and mulch. The two house log, two post and pole plants use timber in round form and the decorative bark plants utilize bark residue primarily from lumber production. The 1986 census identified the same number – two each – of house log plants, post and pole plants, and bark plants.

Production statistics for these individual segments are not reported to protect firm level information. These plants in total manufactured products have a sales value of \$4.6 million – approximately the same as in 1986 when adjusted for inflation.

In 1986, a single plant processed timber into excelsior (curled shreds of wood used as a packing material). The plant still operates in the state; however, it imports all of its excelsior from out of state and thus is considered a secondary manufacturer.

TIMBER SOURCE, USE, AND MOVEMENT

As noted earlier in this report, New Mexico harvest has declined substantially in the last thirty years. The harvest peaked in 1968 at just under 300 MMBF then fell to 61 MMBF in 1996 before rising again to about 100 MMBF in 1997. This section focuses on ownership and geographic sources of timber, types of timber products harvested and processed, species composition, and movement of timber products. It examines New Mexico's timber harvest and the industry's use of timber in the direct manufacture of products. Timber harvested for fuelwood is not included.

Harvest by Ownership

In 1997, timber harvested from New Mexico timberland and manufactured into wood products came from three land ownership categories: private lands, tribal lands, and national forests. All private timberland was classified as non-industrial private forestland. New Mexico has no large tracts of industrial timberland (land owned by individuals or companies operating primary wood processing plants). The State of New Mexico does possess 112,000 acres of state school trust timberland, but volumes harvested and revenues generated are *de minimis* (Souder and Fairfax, 1996).

Nearly two-thirds (63 percent) of the 97.6 MMBF of timber harvested from New Mexico's timberlands in 1997 came from private timberlands (Table 6 and Figure 6). Tribal lands accounted for 25 percent, while only 12 percent came from the national forests. This is a dramatic shift from past industry censuses in which national forests provided the bulk of the harvest — 51, 61, and 84 percent, in 1966, 1974, and 1986, respectively (Setzer and Wilson, 1970; Setzer and Barrett, 1977; McLain, 1989).

Harvest by Product Type

This section focuses on five general product categories:

- Sawlogs - timber products sawn to produce lumber, mine timbers, and the like;
- Vigas and Latillas – specialty beams used in the construction of authentic southwestern adobe structures;
- House logs – timber products used to manufacture log homes;
- Posts and poles – timber products used to manufacture posts and poles for fencing; and
- Pulpwood – timber products used in the production of paper products.

As depicted in Figure 7, sawlogs were the primary timber product harvested in New Mexico in 1997, accounting for 89 percent (86.5 MMBF) of the total harvest. Vigas accounted for about 8 percent (8.0 MMBF), while posts and poles, house logs, and pulp together comprised less than 3 percent of the 1997 harvest. The product shares differ little from those in 1966 and 1986 when sawlogs comprised 83 percent (including firewood) and 93 percent of New Mexico's industrial timber harvest, respectively (Setzer and Wilson, 1970; McLain, 1989). There is no mention of viga production in the past literature, but any such production identified was lumped in as "Other Products."

Ownership Source by Product Type

As shown by Table 7, private timberlands supplied 66 percent (57.4 MMBF) of New Mexico's 1997 sawlog harvest, while tribal timberlands made up 28 percent (24.0 MMBF), with the national forests supplying the remaining six percent (5.0 MMBF). National forests were the primary source of New Mexico's viga harvest, providing 63 percent (5.0 MMBF) in 1997, with the remaining 37 percent (2.9 MMBF) being supplied by private lands. Seventy-one percent of New Mexico's 2.3 MMBF pulpwood harvest came from national

forest land, while 29 percent came from private lands.

Harvest by Geographic Source

The 1997 commercial timber harvest by county is summarized in Table 8. Otero County led the state's 1997 timber harvest with 38 percent of the total harvest, followed by Colfax County at 19 percent and Rio Arriba County with 18 percent. Otero, Colfax and Rio Arriba counties comprised 75 percent of the total 1997 timber harvest, with 53 percent of the timberland in these counties being privately owned and 45 percent managed by the Forest Service. Comparatively, in 1986, Rio Arriba, Catron and Otero Counties predominated, accounting for 91 percent of the total timber harvest. Collectively, 76 percent of these three counties' timberlands are national forest lands with only 14 percent being privately held (Van Hooser *et al.*, 1993).

Harvest by Species

Ponderosa pine (*Pinus ponderosa*) was New Mexico's most harvested species in 1997, accounting for 55.2 MMBF, or 56.6 percent of the total harvest by species, followed by Douglas-fir (*Pseudotsuga menziesii*) with 25.5 percent or 24.9 MMBF (Table 9 and Figure 8). The remaining harvest by species was white fir and subalpine fir (*Abies spp.*) with 11.2 percent; Engelmann spruce and blue spruce (*Picea spp.*) with 6.5 percent; and pinyon pine (*Pinus monophylla* or *Pinus edulis*), juniper (*Juniperus scopulorum*), and aspen (*Populus spp.*) with cumulatively 0.2 percent of the harvest.

This distribution is understandable given New Mexico's timberlands species' distribution is very similar with 42 percent of the standing timber being ponderosa pine, 22 percent Douglas-fir, 22 percent true firs, 9 percent spruce, and 5 percent other species.

As shown in Table 10 and Figure 9, ponderosa pine has consistently accounted for

the highest proportion of New Mexico's timber harvest, comprising nearly half or more in 1966, 1974, 1986, and 1997. Douglas-fir has typically been the second most harvested species by volume in New Mexico, accounting for 16 – 26 percent of historical annual harvests. Pinyon pine, juniper, and aspen have collectively represented small proportions of the total timber harvest, except in years (1966, 1969, and 1974) when fuelwood harvests (which included substantial amounts of pinyon pine) were included in total harvest estimates.

Product Type by Species

Ponderosa pine remains the predominant species harvested for lumber production in 1997, accounting for 54 percent (46.5 MMBF) of the sawlog harvest. Douglas-fir was next with 28 percent (24.1 MMBF), followed by true firs with 12 percent (10.7 MMBF) and spruce with 6 percent (4.9 MMBF) (Table 11).

In 1997, four species were harvested for vigas. Ponderosa pine accounted for 70 percent of viga production, with spruce providing 18 percent. Douglas-fir accounted for 10 percent of the vigas, with true firs making up the remaining 2 percent.

Ponderosa pine was the only species reported harvested for pulpwood and used by pole producers in 1997, with ponderosa pine and a small true fir component comprising the house log/log home use.

Timber Flow

Although New Mexico's intrastate and interstate timber flows were examined, discussion is limited to avoid disclosing firm-level information on the state's relatively few mills.

New Mexico's mills received 90.8 MMBF of timber for processing in 1997. Since New Mexico's timber harvest was 97.6 MMBF, New Mexico exported about 6.7 MMBF to other states. The net exports resulted from 13.9 MMBF being imported from Colorado, with timber exports of 14.2 MMBF to Arizona and 6.5 MMBF to Colorado for processing in 1997 (Table 12).

Sawlogs comprised 99 percent of the timber that was imported from Colorado in 1997. Sawlogs also comprised most of the New Mexico timber exported to Colorado and Arizona mills. Slightly over two million board feet was exported as pulpwood to Arizona. As noted earlier, this 2.3 MMBF represented the entirety of the New Mexico pulpwood harvest for 1997.

Twenty-one percent of New Mexico's 1997 timber harvest left the state for processing in Arizona and Colorado. Within New Mexico, timber generally did not move long distances. In 1997, 66 percent of the timber harvested was processed in the same county where the timber was harvested; another 10 percent was processed in adjacent New Mexico counties.

Timber Use by Ownership Source

Figures for New Mexico's total timber harvest and its timber processed are different because of timber flows into and out of the state. As discussed, about 13.9 MMBF Scribner of timber (14 percent of the timber processed in New Mexico in 1997) was harvested outside the state, and 20.7 MMBF (21 percent of New Mexico's 1997 timber harvest) was processed outside the state. This section examines characteristics of timber processed by New Mexico's mills.

As shown in Table 13, private and tribal timberlands contributed 90 percent (82.2 MMBF) of the timber received by New Mexico mills in 1997. Private timberlands supplied about 63 percent of 1997 receipts, while tribal lands contributed 27 percent. National forests supplied only 10 percent of the timber received by New Mexico's industry in 1997.

To a degree, different industry sectors rely on different land ownerships for their timber. For instance, New Mexico's sawmills received 81.9 MMBF of sawlogs in 1997 (Table 14). Ninety-six percent of that volume came from private and tribal timberlands, with only 4 percent coming from national forests. In contrast, viga receipts totaled 8.1 MMBF in 1997. National forests provided 5.0 MMBF (62 percent of viga harvest) of timber for viga production, primarily through personal use permits. Private lands accounted for the remaining 38 percent.

Utilization of the Log

This section traces the flow of New Mexico's timber harvest through various manufacturing sectors. Since mill residue products and timber products are displayed, volumes are presented in cubic feet rather than board feet Scribner. The following conversion factors, developed from the recent census, were used to convert Scribner volume to cubic foot volume:

- 4.97 board feet per cubic foot for sawlogs;
- 4.64 board feet per cubic foot for vigas logs;
- 4.50 board feet per cubic foot for house logs;
- 3.92 board feet per cubic foot for pulpwood;
- 1.00 board foot per cubic foot for posts and poles.

New Mexico's 1997 timber harvest was approximately 19,060 thousand cubic feet (MCF), exclusive of bark (Figure 10). Of this volume, 16,471 MCF went to sawmills, 1,742 MCF went to viga manufacturers, 259 MCF went to post and pole plants and log home/house log producers, and 588 MCF to pulp and paper plants.

Of the 16,471 MCF received by sawmills for manufacturing, only 6,289 MCF (38 percent) actually became finished lumber or other sawn products. The remaining 10,182 MCF (62 percent) became mill residue. About 6,478 MCF of sawmill residue was used by the pulp and paper and particleboard industries, 1,299 MCF was used as hogfuel, 2,242 MCF was used for other purposes such as livestock bedding, corral lumber and firewood, and 163 MCF remained unused in 1997.

Viga manufacturers received 1,742 MCF of New Mexico's 1997 timber harvest to manufacture 1,026 MCF (59 percent) of finished vigas. The remaining 716 MCF was mill residue. House log/log home manufacturers and post and pole yards received 259 MCF of wood fiber from New Mexico's timberlands in 1997. Approximately 151 MCF of house logs and posts and poles were manufactured in 1997, generating 108 MCF of residue.

MILL RESIDUE QUANTITY, TYPE, AND USE

As indicated, a substantial portion of the wood fiber processed by primary forest products plants ends up as mill residue. Mill residue from primary wood products manufacturers can present difficult and expensive disposal problems, but can also be used to produce additional products and generate revenue. This section details the volume and use of mill residues generated by New Mexico's primary forest products industry in 1997.

Sawmills are the main residue producers in New Mexico; basically, sawmills generate three types of wood fiber residue:

- 1) Coarse or chippable residue consisting of slabs, edging, trim, and log ends from lumber manufacturing;
- 2) Fine residue consisting of planer shavings and sawdust; and
- 3) Bark.

The 1997 census gathered information on volumes and uses of mill residue. Actual residue volumes were obtained from sawmills selling a large portion of their residues. For the other sawmills, residue volume factors, which express mill residue generated per unit of lumber produced, were used to estimate total residue volumes. All mills reported how various residues were used on a percentage basis. The sawmill residue factors are shown in Table 15 and represent statewide averages.

New Mexico sawmills generated 12,572 MCF of mill residue and nearly 98 percent of that was utilized in 1997 (Table 16). The pulp and paper mill in Arizona and the particleboard plant and bark products manufacturers in New Mexico are the largest users of residues generated in the state.

Coarse residue was the state's largest residue component in 1997. New Mexico

sawmills produced 5,633 MCF of coarse residue, 99.6 percent of which was utilized for some purpose in 1997. Slabs (the exterior portions of logs removed by the saw, having one flat side and one curved surface), log ends, and pieces of unsuitable lumber are a major component of the coarse material produced by sawmills. Nearly 90 percent of this material was chipped and used by the pulp and paper industry and virtually all of the rest was sold for firewood or corral fence material (Table 17).

Fine residues - sawdust and planer shavings - made up the second largest component of sawmill residues -- 4,553 MCF in 1997. Almost 97 percent of these residues were utilized in some fashion, primarily as raw material for particleboard plants, hogfuel, or animal bedding in 1997.

Bark from the logs processed by New Mexico sawmills was most commonly burned as hogfuel. Some was remanufactured into decorative bark products or used as garden mulch. New Mexico sawmills generated 2,386 MCF of bark in 1997, of which 63 percent was used by the industry as hogfuel and 25 percent as decorative bark products. Another 8 percent was used in firewood and fencing (that which remained on the slabs), garden mulch, and livestock bedding (Table 17).

Coinciding with the reduction of sawlogs being processed, residue production from New Mexico's sawmills has dropped appreciably since 1986. In 1997, 5.6 million cubic feet (MMCF) of coarse residues (slabs, edging & trim); 4.5 MMCF of fine residues (sawdust & planer shavings); and 2.4 MMCF of bark residues were produced for a total of 12.5 MMCF. This is down 44 percent from 1986.

The total utilization of these residues surpassed 98 percent in 1997. Utilization is up substantially from the 80.6 percent reported in 1986 primarily because of the

reduction in total residues produced from the reduced volume of sawlogs being processed. Almost all, 99.6 percent, of the coarse residues were used. Uses included chips for paper production (88 percent), hogfuel (2 percent) and other uses, i.e. firewood, corral lumber, etc. (10 percent). Of the 96.9 percent of fine residues that were utilized, 33 percent was remanufactured into particleboard, 27 percent was used in hogfuel and 40 percent was used as livestock bedding. Better than 95 percent of the bark residue produced was utilized, 56 percent as decorative bark or garden mulch, and 44 percent as hogfuel.

Other processors in New Mexico utilized about 8.8 MMBF of timber to produce vigas and latillas, house logs, posts, and poles. These facilities generated approximately 1.1 MMCF of mill residue in 1997. About 250 MCF was bark and the remainder was log ends, trim, and peelings from manufacturing vigas, latillas, posts, and poles. About 60 percent of the non-bark residue was sold for fuelwood, about 38 percent, mostly log ends and trim, was used by employees or given away, and only two percent of non-bark residue was piled and burned. Ninety-eight percent of bark residue was piled and burned.

CAPACITY TO PROCESS TIMBER

This section focuses on production capacity and capacity utilization in New Mexico's sawtimber processing plants – sawmills, house logs and vigas plants. Sawtimber is timber of "sufficient size and quality to be suitable for conversion into lumber" (Random Lengths, 1993). Respondent mills were asked to specify their annual product output capacity (production capacity), assuming sufficient supplies of raw materials, and a firm market demand for their products.

Sawmills reported their capacity in thousand board feet, lumber tally; vigas producers reported capacity in lineal feet of vigas. Product recovery ratios were calculated for each firm using timber input and product output. An input capacity was calculated for each firm using product recovery ratios and product output capacity. This estimate is expressed in units of raw material input (board feet Scribner of timber) and called "capacity to process timber" or "processing capacity."

New Mexico's total estimated capacity to process sawtimber in 1997 was 170 million board feet (MMBF) Scribner (Table 18). Overall, 48 percent of this capacity was utilized in 1997, to process almost 81.7 MMBF of sawtimber.

PRODUCT MARKETS

Respondent mills summarized their 1997 shipments of finished wood products, providing information on volume, sales value, and geographic destination.

Mills usually distributed their products in two ways: 1) through their own distribution channels, or 2) through independent wholesalers and selling agents. Because of subsequent wholesaling transactions, the geographic destination reported here may not precisely reflect final delivery points of shipments. Figure 11 identifies the regions where New Mexico's manufactured forest products were distributed in 1997.

New Mexico's primary wood products sales in 1997 were \$77.7 million (Table 19). Sales of lumber, particleboard, and other sawn products accounted for more than 80 percent of these sales, with vigas sales accounting for 13 percent and miscellaneous products for 6 percent. New Mexico, the Far West and the South collectively accounted for more than 85 percent of lumber and other sawn product sales. The majority (80 percent) of vigas was sold in New Mexico. There were limited viga sales to the Far West (6 percent), other Rocky Mountain states (6 percent), and the Northcentral states (8 percent).

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Table 1. Number of Active New Mexico Primary Wood Products Facilities by County, 1997

County	Sawmills	Vigas	Other	Total
Bernalillo	1	1	1 Particleboard Plant 1 Bark Products 1 Post & Pole Plant	5
Catron	1	1		2
Colfax	1			1
Mora	1			1
Otero	4	2	1 House Log Plant	7
Rio Arriba	5	3		8
Sandoval	1	1	1 Decorative Bark	3
San Miguel	2	2	1 Post & Pole Plant 1 House Log Plant	6
Santa Fe	2	3		5
Taos	3	2		5
Torrance	1			1
1997 Total	22*	15*	7	44
1986 Total	26	5-10	2 House Log Plants 2 Bark Plants 2 Particleboard Plants 2 Post & Pole Plants 1 Fiberboard Plant 1 Excelsior Plant	41-46

Note: * There were 11 sawmills that also produced vigas, these are reported as two distinct mills.
Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, MT; Van Hooser, D.D. et. al., 1993, New Mexico's Forest Resources, Intermountain Research Station, Resource Bulletin INT-79, Ogden, UT.

Table 2. Sales Value of New Mexico's Primary Wood Products, 1997 and 1986

Product	1997 Sales	1986 Sales
Lumber and sawn products	\$42,944,500	\$92,870,500
Vigas & Latillas	\$10,149,000	\$ 3,600,000
Particleboard/MDF	\$20,000,000	\$69,000,000
Other Products ^a	\$ 4,643,500	\$ 4,500,000
Total	\$77,737,000	\$169,970,500

a – Other products include log homes/house logs, post & poles and bark products.

All sales are reported F.O.B. the manufacturer's plant.

Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, MT; McLain, W.H. 1989, New Mexico's Timber Production and Mill Residue, 1986, USDA Forest Service Intermountain Forest and Range Experiment Station, Resource Bulletin INT-59, Ogden, UT; Miller Freeman, Inc. 1998, 1997 Directory of the Wood Products Industry, San Francisco, CA; and Western Wood Products Association Statistical Yearbooks (various years), Portland, OR.

Table 3. Number of Sawmills and Average Production per Mill, 1960, 1962, 1966, 1986, and 1997.

<u>Year</u>	<u>Number of Sawmills</u>	<u>Average Production per Mill</u>
1960	117	1.9 MMBF
1962	85	2.9 MMBF
1966	64	4.1 MMBF
1986	25	9.2 MMBF
1997	22	4.9 MMBF

Source: McLain, W.H. 1989, New Mexico's Timber Production and Mill Residue, 1986, USDA Forest Service Intermountain Forest and Range Experiment Station, Resource Bulletin INT-59, Ogden, UT; Setzer and Wilson, 1970, Timber Products in the Rocky Mountain States, 1966, USDA Forest Service Intermountain Forest and Range Experiment Station, Resource Bulletin INT-9, Ogden, UT; Van Hooser, D.D. et al., 1993. New Mexico's Forest Resources. Intermountain Research Station, Resource Bulletin INT-79, Ogden, UT; and FIDACS, 1997 The University of Montana Bureau of Business and Economic Research, Missoula, MT.

Table 4. Number of New Mexico Sawmills by Production Size and Percentage of Lumber Produced by Size Class, 1966, 1986 and 1997

Year	----- Number of Sawmills -----		Total
	Under 10 MMBF	Over 10 MMBF	
1997	18	4	22
1986	17	9	26
1966	58	6	64
1962	85	*	85
1960	117	*	117

Year	---- Percent of Lumber Output ----		Lumber Output MBF
	Under 10 MMBF	Over 10 MMBF	
1997	10%	90%	108,675
1986	12%	88%	232,000
1966	38%	62%	262,848
1962	*	*	242,500
1960	*	*	224,400

Note: Size class is based on reported lumber production. MMBF denotes million board feet lumber tally.

* In 1960 and 1962 all mills were included in <10 MMBF to avoid disclosing individual operations.

Source: McLain, W.H. 1989, New Mexico's Timber Production and Mill Residue, 1986, USDA Forest Service Intermountain Forest and Range Experiment Station, Resource Bulletin INT-59, Ogden, UT; Setzer and Wilson, 1970, Timber Products in the Rocky Mountain States, 1966, USDA Forest Service Intermountain Forest and Range Experiment Station, Resource Bulletin INT-9, Ogden, UT; and FIDACS, 1997 The University of Montana Bureau of Business and Economic Research, Missoula, MT.

Table 5. New Mexico Lumber Production, by Size of Mill, 1997

<u>Size Class</u>	<u>Number of Mills</u>	<u>Volume Board Feet</u>	<u>Percent of Total</u>	<u>Average per Mill (BF)</u>
A - over 10 MMBF	4	98,300,000	90%	24,575,000
B - under 10 MMBF	18	10,375,000	10%	471,600
Total	22	108,675,000	100%	4,940,000

Note: Sized class is based on reported lumber production. BF denotes board feet lumber tally.
Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 6. New Mexico's 1997 Timber Harvest by Ownership Source

<u>Origin</u>	<u>Board Feet Scribner</u>	<u>Percent of Total</u>
Private and Tribal Timberland	85,903,000	88%
Private	61,853,000	63%
Tribal	24,050,000	25%
Public Timberland	11,723,000	12%
National Forest	11,723,000	12%
Other Public	--	--
All Sources	97,626,000	100%

Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 7. New Mexico's 1997 Timber Products Harvested by Ownership Source

-----Thousands of Board Feet, Scribner -----						
<u>Ownership Source</u>	<u>Sawlogs</u>	<u>Vigas</u>	<u>Posts & Poles</u>	<u>House Logs</u>	<u>Pulpwood & Fuelwood</u>	<u>All Products</u>
Tribal Timberland	24,044	6	0	0	0	24,050
National Forest	5,048	5,014	0	0	1,660	11,723
Private Timberland	57,359	2,964	475	380	673	61,853
All Sources	86,451	7,984	475	380	2,333	97,626

-----Percent Product by Ownership-----						
<u>Ownership Source</u>	<u>Sawlogs</u>	<u>Vigas</u>	<u>Posts & Poles</u>	<u>House Logs</u>	<u>Pulpwood & Fuelwood</u>	<u>All Products</u>
Tribal Timberland	28%	a	0%	0%	0%	25%
National Forest	6%	63%	0%	0%	71%	12%
Private Timberland	66%	37%	100%	100%	29%	63%
All Sources	89%	8%	a	a	2%	100%

Note: a = less than 0.5 percent.

Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 8. New Mexico's Timber Harvest by County for Selected Years

County	1966		1986		1997	
	MBF Scribner	Percent of Harvest	MBF Scribner	Percent of Harvest	MBF Scribner	Percent of Harvest
Otero	17,335	7%	16,982	10%	36,866	38%
Colfax	32,853	14%	4,000	2%	18,450	19%
Rio Arriba	37,156	15%	69,367	42%	17,107	18%
Cibola	-	-	13,857	8%	7,973	8%
Sandoval	66,619	28%	5,932	4%	4,360	4%
San Miguel	9,140	4%	2,075	1%	2,259	3%
Mora	957	a	3,830	2%	2,040	2%
Catron	25,588	11%	29,494	18%	2,973	3%
McKinley	36,692	15%	-	-	2,000	2%
Socorro	2,739	1%	-	-	1,025	1%
Taos	6,767	3%	7,066	4%	1,245	1%
San Juan	-	-	8,159	5%	500	a
Lincoln	-	-	1,450	1%	198	a
Torrance	-	-	-	-	120	a
Bernalillo	691	a	-	-	490	a
Valencia	4,548	2%	-	-	20	a
Grant	538	a	663	a	-	-
Eddy	-	-	548	a	-	-
Los Alamos	54	a	-	-	-	-
Santa Fe	-	-	2,865	2%	-	-
Total	242,313		166,342		97,626	

Note: a = less than 0.5 percent, percentage detail may not add due to rounding.

Source: McLain, W.H. 1989, New Mexico's Timber Production and Mill Residue, 1986, USDA Forest Service Intermountain Forest and Range Experiment Station, Resource Bulletin INT-59, Ogden, UT; Setzer and Wilson, 1970, Timber Products in the Rocky Mountain States, 1966, USDA Forest Service Intermountain Forest and Range Experiment Station, Resource Bulletin INT-9, Ogden, UT; Van Hooser, D.D. et. al., 1993, New Mexico's Forest Resources. Intermountain Research Station, Resource Bulletin INT-79, Ogden, UT; and FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, MT.

Table 9. New Mexico's 1997 Timber Harvest by Species

Species ^a	MBF	
	Scribner	Percent
Ponderosa pine	55,235	56.6%
Douglas-fir	24,895	25.5%
True firs	10,981	11.2%
Spruce	6,354	6.5%
Other Species	161	0.2%
All species	97,626	100.0%

Note: ^a – Spruce includes Engelmann and blue spruce; true firs include white and subalpine fir; and other species includes juniper, pinyon pine, and aspen.

Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 10. New Mexico Timber Harvest by Species, 1966, 1986, and 1997

Species ^a	--- Percent of Harvest ---		
	1966	1986	1997
Ponderosa pine	49.1	67.5	56.6
Douglas-fir	16.8	16.1	25.5
True firs	4.8	9.2	11.2
Spruce	14.2	2.9	6.5
Pinyon pine, juniper, Limber pine and aspen	15.1	4.3	0.2
All Species	100.0	100.0	100.0

Notes: a – spruce includes Engelmann and blue spruce, true firs includes white and subalpine fir.
Sources: Setzer, T. S. 1971 - USDA For. Ser. Res. Note INT-130. Setzer, T. S. and A.K. Wilson 1970 - USDA For. Ser. Res. Note INT-9. FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 11. New Mexico's 1997 Timber Harvest by Species and Product Type

-----Thousand Board Feet, Scribner -----				
Species ^a	Sawlogs	Vigas	Other Products	All Products
Ponderosa pine	46,515	5,589	3,122	55,235
Douglas-fir	24,126	769	0	24,895
True firs	10,739	212	30	10,981
Spruce	4,940	1,414	0	6,354
Other Species	131	0	30	161
All species	86,451	7,984	3,182	97,626

----- Percentage of Total Harvest -----				
Species ^a	Sawlogs	Vigas	Other Products	All Products
Ponderosa pine	54%	70%	98%	56.6%
Douglas-fir	28%	10%	-	25.5%
True firs	12%	2%	1%	11.2%
Spruce	6%	18%	-	6.5%
Other Species	b	-	1%	0.2%
All species	89%	8%	3%	100.0%

Note: a – spruce includes Engelmann and blue spruce, true firs includes white and subalpine fir.

Note: b - less than 0.5 percent

Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 12. New Mexico's 1997 Timber Product Exports and Imports to Other States

-----Thousand Board Feet, Scribner -----			
<u>Timber Product</u>	<u>Imports</u>	<u>Exports</u>	<u>Net Imports (Net Exports)</u>
Sawlogs	13,810	18,400	(4,590)
Vigas	100	-	100
Other products	88	2,333	(2,245)
All products	13,998	20,733	(6,735)

Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 13. Source of Timber Products Received by New Mexico Mills, 1997

<u>Ownership Source</u>	<u>MBF Scribner</u>	<u>Percent of Total</u>
Private and Tribal Timberland	82,238	90%
Private	57,788	63%
Tribal	24,450	27%
National Forest	8,562	10%
All Sources	90,800	100%

Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 14. Ownership Source of Timber Products Delivered to New Mexico's Forest Products Industry Sectors, 1997.

Ownership Source	-----Thousands of Board Feet, Scribner -----			
	Sawlogs	Vigas	Other Products	All Products
Private and Tribal Timberland	78,313	3,070	855	82,238
Private	53,869	3,064	855	57,788
Tribal	24,444	6	0	24,450
National Forest	3,548	5,014	400	8,562
All Sources	81,861	8,084	855	90,800

Ownership Source	----- Percentage of Total Harvest -----			
	Sawlogs	Vigas	Other Products	All Products
Private and Tribal Timberland	96%	38%	100%	90%
Private	66%	38%	100%	64%
Tribal	30%	a	-	27%
National Forest	4%	62%	100%	9%
All Sources	100%	100%	100%	100%

Note: a = less than 0.5 percent.

Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 15. New Mexico's 1997 Sawmill Residue Factors

<u>Type of Residue</u>	<u>Cubic Feet per Thousand Board Feet Lumber Tally¹</u>
Coarse	49.8
Sawdust	18.9
Planer Shavings	13.3
Bark	22.0
-----	-----
Total	104.0

Note: 1 – cubic feet of the various residue types generated for every 1,000 board feet of lumber manufactured.

Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 16. New Mexico's 1997 Estimated Volume of Wood Residue Generated by Sawmills and Utilization of Residue

<u>Residue Type</u>	<u>----- Thousand Cubic Feet -----</u>			<u>----- Percent of Total -----</u>		
	<u>Utilized</u>	<u>Unutilized</u>	<u>Total</u>	<u>Utilized</u>	<u>Unutilized</u>	<u>Total</u>
Coarse	5,611	22	5,633	99.6%	0.4%	44.8%
Fine	4,412	141	4,553	96.9%	3.1%	36.2%
Bark	2,278	108	2,386	95.5%	4.5%	19.0%
Total	12,301	271	12,572	97.8%	2.2%	100.0%

Note: Fine residues include sawdust and planer shavings.

Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 17. New Mexico's 1997 Production and Disposition of Sawmill Residues

<u>Residue Type</u>	----- Thousand Cubic Feet -----					<u>Total</u>
	<u>Total Utilized</u>	<u>Remanufactured Products</u>	<u>Hogfuel</u>	<u>Other Uses</u>	<u>Unused</u>	
Coarse	5,611	5,052 ^a	17	542	22	5,633
Fine						
Planer shavings	1,449	563 ^a	346	540	0	1,449
Sawdust	2,963	866 ^b	936	1,161	141	3,104
Bark	2,278	590 ^c	1,500	188	108	2,386
Total	12,301	7,071	2,799	2,431	271	12,572

a – Pulp & paper mill

b – Particleboard Plant

c – Decorative bark plant

Source: FIDACS 1997. The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 18. New Mexico's 1997 Estimated Sawtimber Processing Capacity and Capacity Utilized

<u>Plant Type</u>	---- Volumes in Thousand Board Feet, Scribner ----			
	<u>Capacity to Process Sawtimber</u>	<u>Actual Volume Processed</u>	<u>Percent of Capacity Utilized</u>	<u>Unutilized Capacity</u>
Sawmills	170,538	81,654	48%	88,884

Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Table 19. Destination and Value of New Mexico's 1997 Primary Wood Products Sales

----- Thousand Dollars -----							
<u>Product</u>	<u>New Mexico</u>	<u>Rocky Mountain States</u>	<u>Far West</u>	<u>North Central</u>	<u>South</u>	<u>Northeast</u>	<u>Total</u>
Lumber, Timbers, & Associated Products	\$11,470	\$4,127	\$13,878	\$1,900	\$11,570	-	\$42,945
Particleboard	a	a	a	a	a	a	\$20,000 ^b
Vigas & Latillas	\$ 8,006	\$659	\$ 659	\$ 825	-	-	\$10,149
Miscellaneous Products	\$ 1,841	\$1,581	\$ 406	\$150	\$ 665	-	\$ 4,643
Total							\$77,737

----- Percentage of Sales by Region -----							
Lumber, Timbers, & Associated products	27	10	32	4	27	-	55.2%
Particleboard	a	a	a	a	a	a	25.7%
Vigas & Latillas	80	6	6	8	-	-	13.1%
Miscellaneous Products	40	34	9	3	14	-	6.0%
Total							100.0%

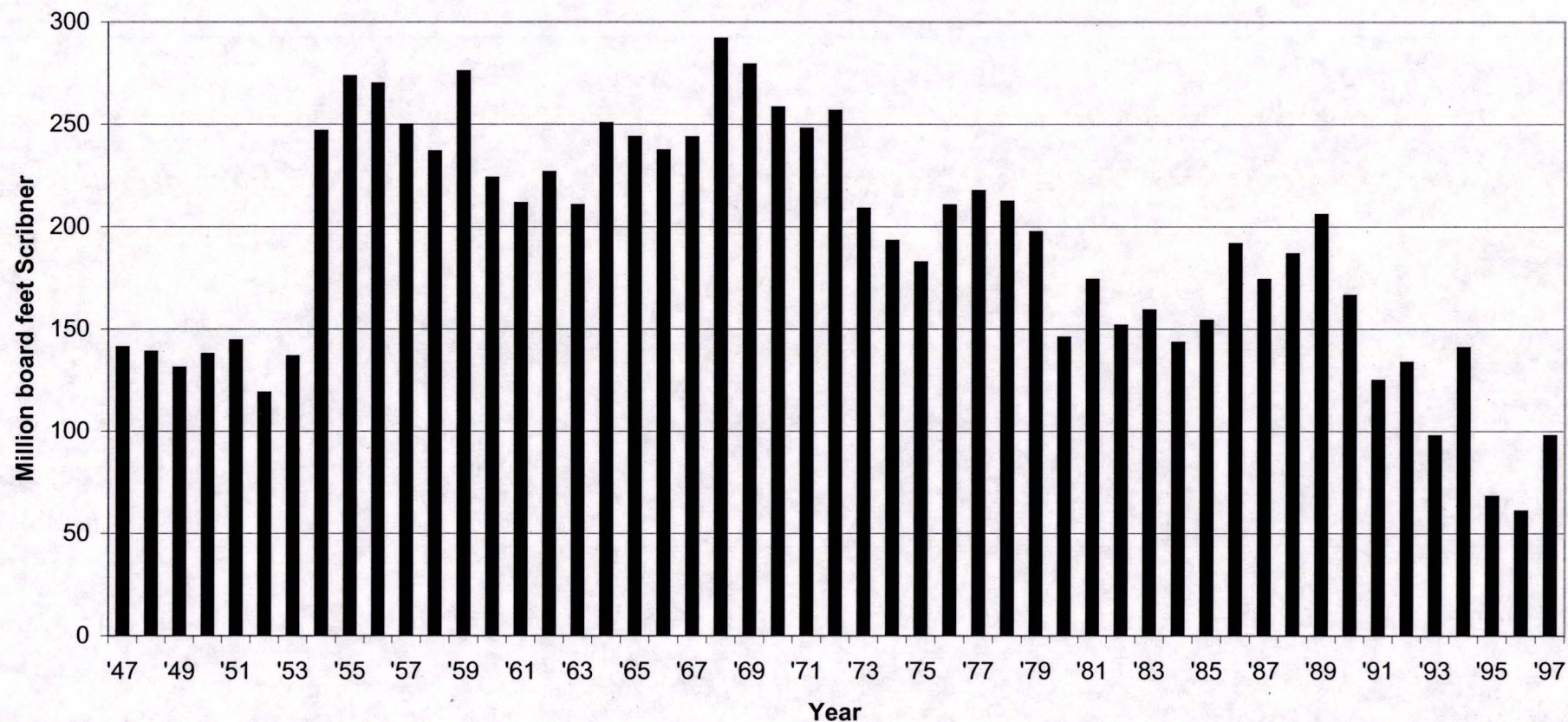
Note: No lumber or house logs sales were reported sold to foreign markets in 1997.

a – market destination information unavailable

b – market value derived from 1997 Directory of the Wood Products Industry (Miller Freeman, 1998)

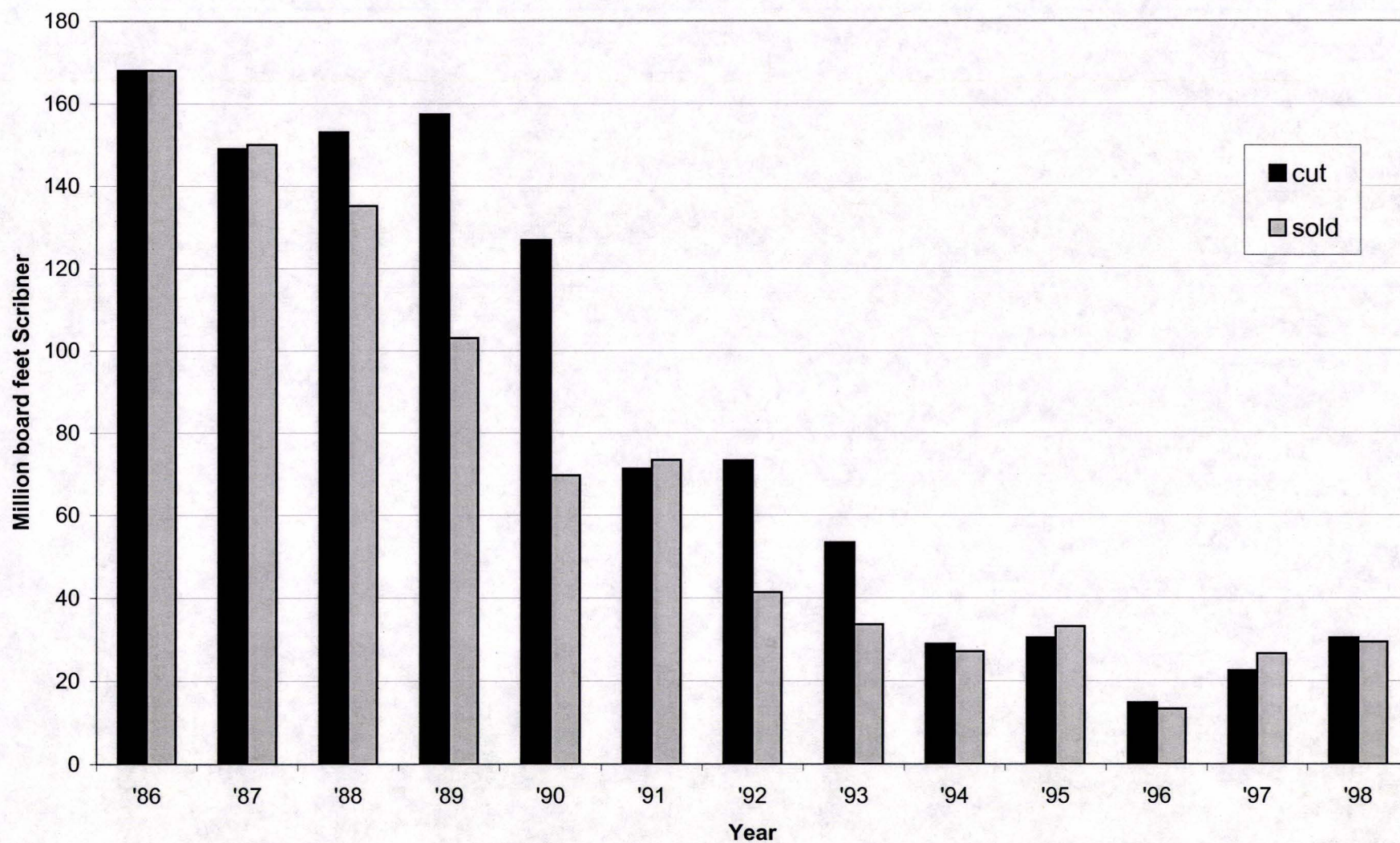
Source: FIDACS 1997, The University of Montana Bureau of Business and Economic Research, Missoula, Montana.

Figure 1
New Mexico Timber Harvest
1947-1997--excluding fuelwood



Derived by the University of Montana BBER using: Green and Setzer, 1974, The Rocky Mountain Timber Situation, 1970, USDA Forest Service Intermountain Forest and Range Experiment Station, Resource Bulletin INT-10, Ogden, UT; McLain, 1989, New Mexico's Timber Production and Mill Residue, 1986, USDA Forest Service Intermountain Research Station, Resource Bulletin INT-59, Ogden, UT; Setzer and Wilson 1970, Timber Products in the Rocky Mountain States, 1966, USDA Forest Service Intermountain Forest and Range Experiment Station, Resource Bulletin INT-9, Ogden, UT; Setzer and Barret 1977, New Mexico Timber Production and Mill Residues, 1974, USDA Forest Service Intermountain Forest and Range Experiment Station, Research Note INT-231, Ogden, UT; WWPA, Statistical Yearbooks (various years), Portland, OR; and Wilson and Spencer, 1967, Timber Resources and Industries in the Rocky Mountain States, USDA Forest Service Intermountain Forest and Range Experiment Station, Resource Bulletin INT-7, Ogden, UT.

Figure 2
New Mexico National Forest Timber Cut and Sold
1986-1998--including fuelwood



Source: USDA Forest Service Region Three, Timber Cut and Sold Reports, Albuquerque, NM.

Figure 3
Locations of New Mexico's Active Timber-Processing Facilities, 1997

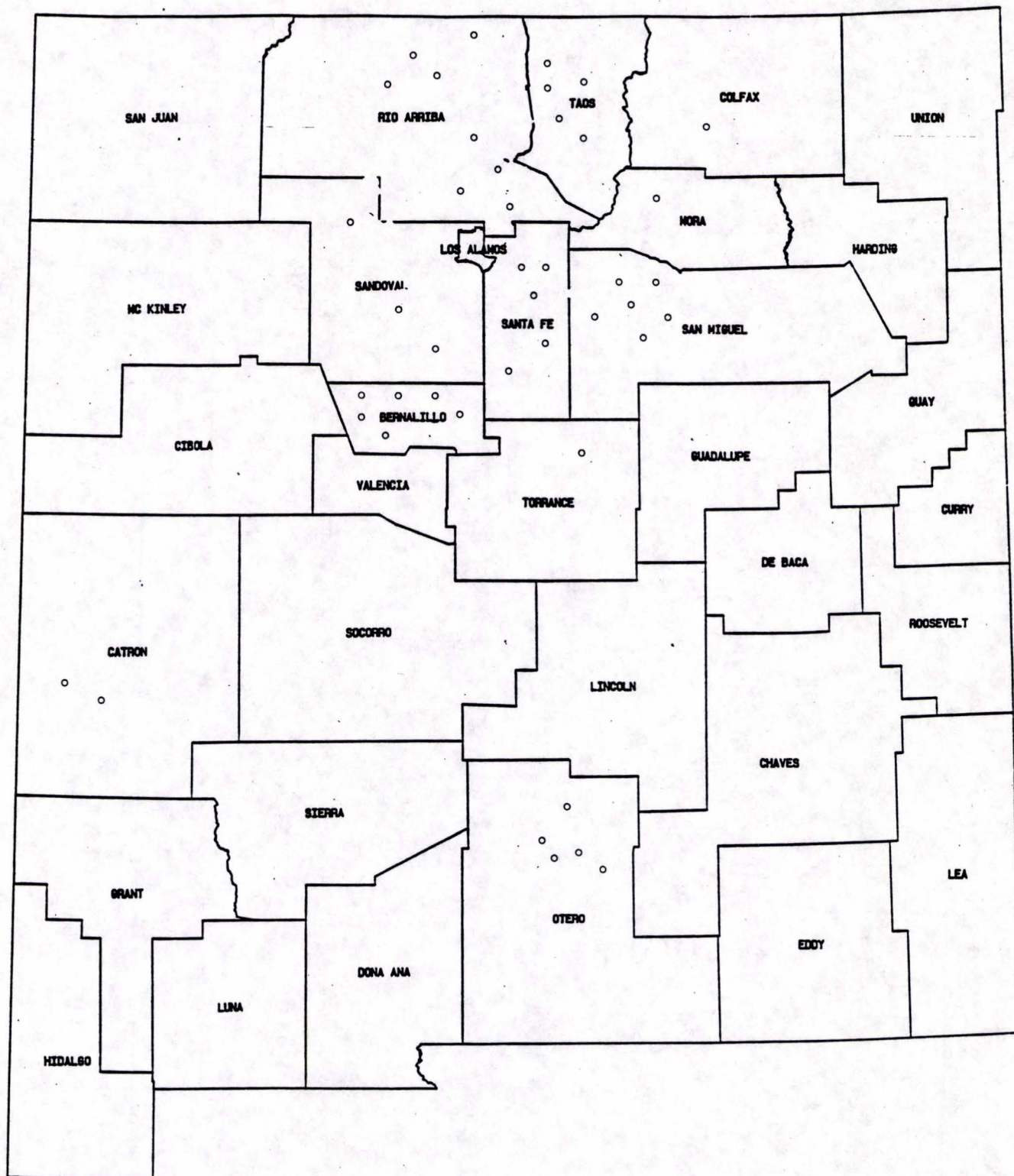
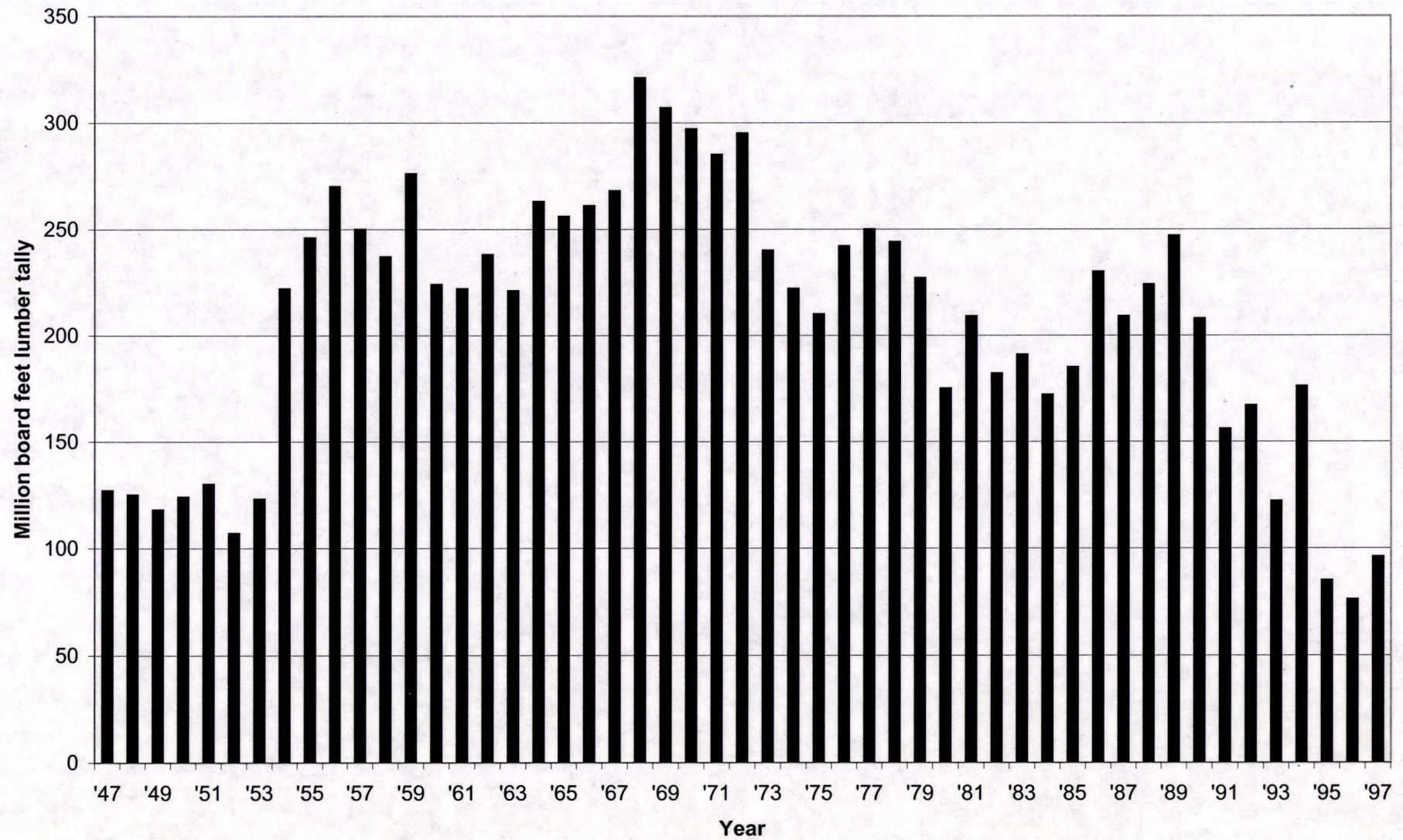
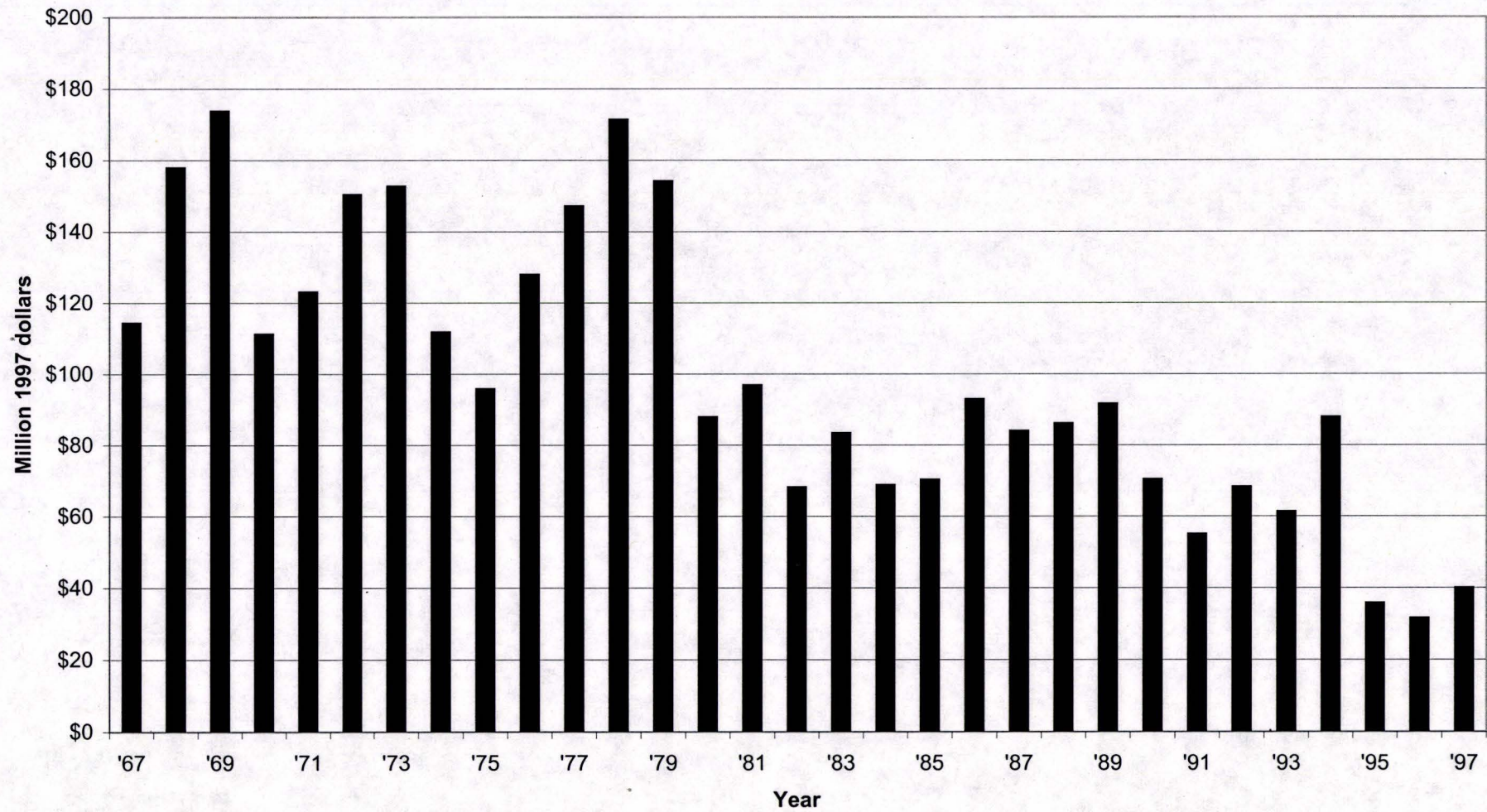


Figure 4
New Mexico Lumber Production
1947-1997



Source: Western Wood Products Association (WWPA) Statistical Yearbooks (various years), Portland, OR.

Figure 5
New Mexico Lumber Sales
1967-1997



Source: Western Wood Products Association Statistical Yearbooks (various years), Portland, OR.

Figure 6
New Mexico 1997 Timber Harvest
by Ownership

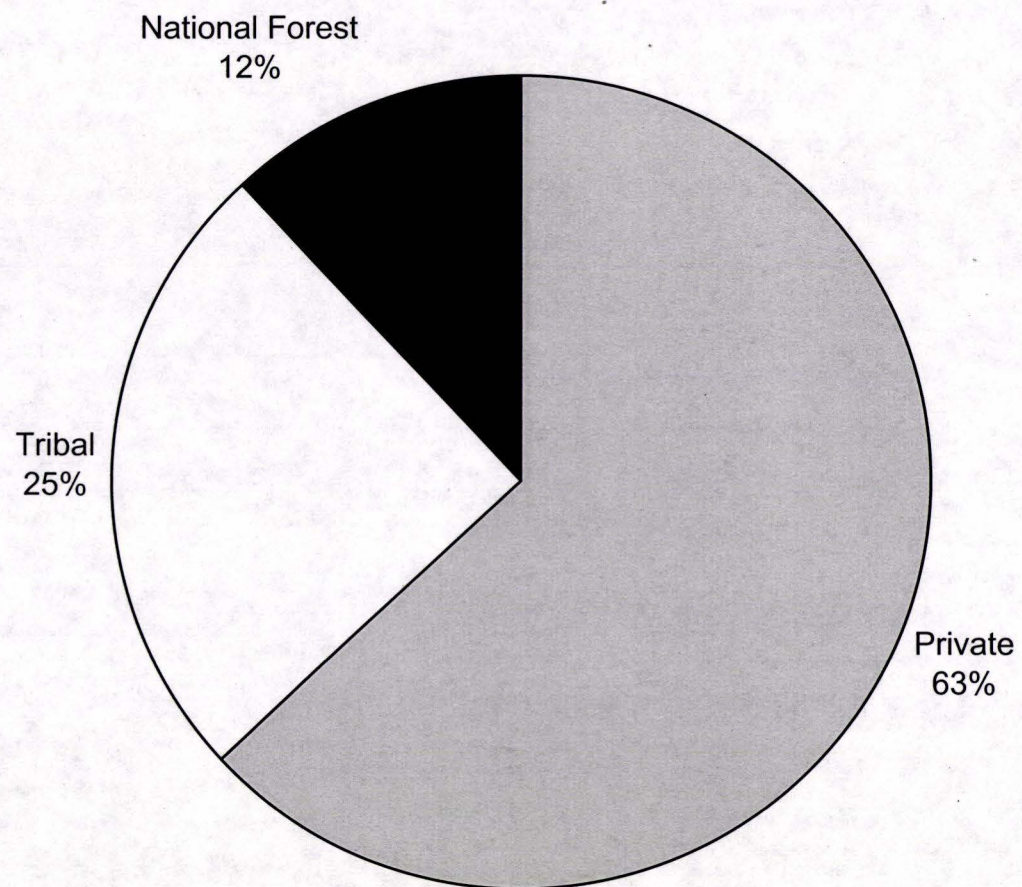


Figure 7
New Mexico 1997 Timber Harvest
by Product

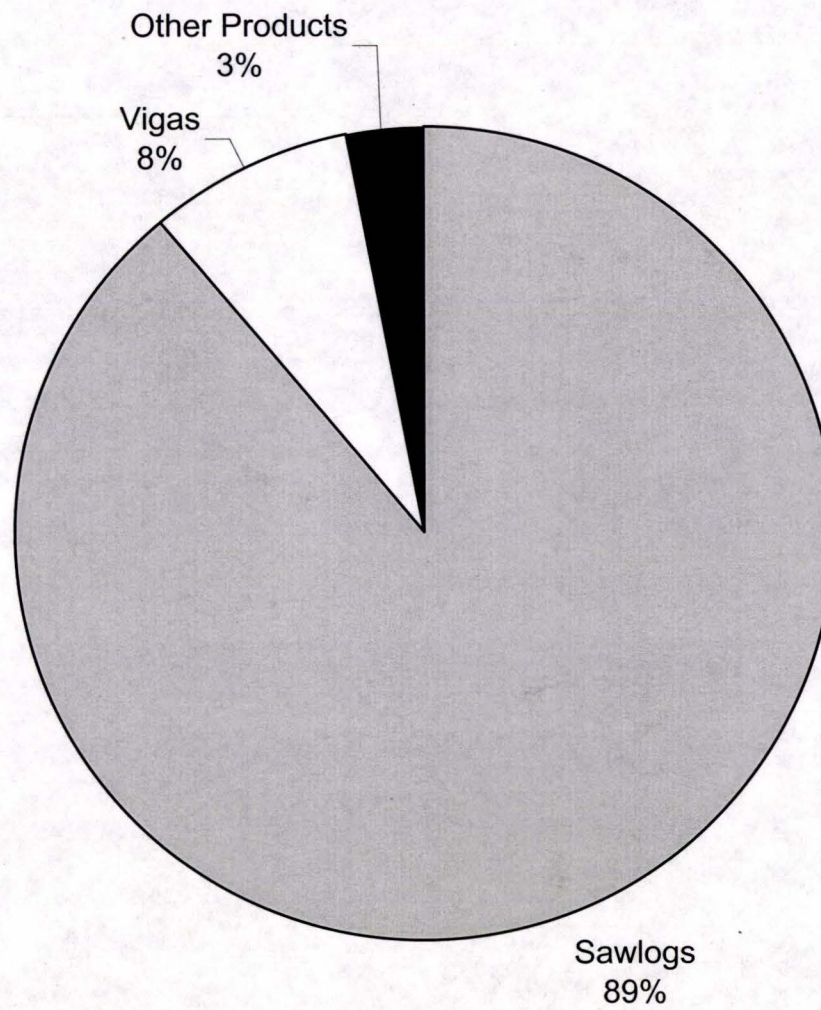


Figure 8
New Mexico 1997 Timber Harvest
by Species

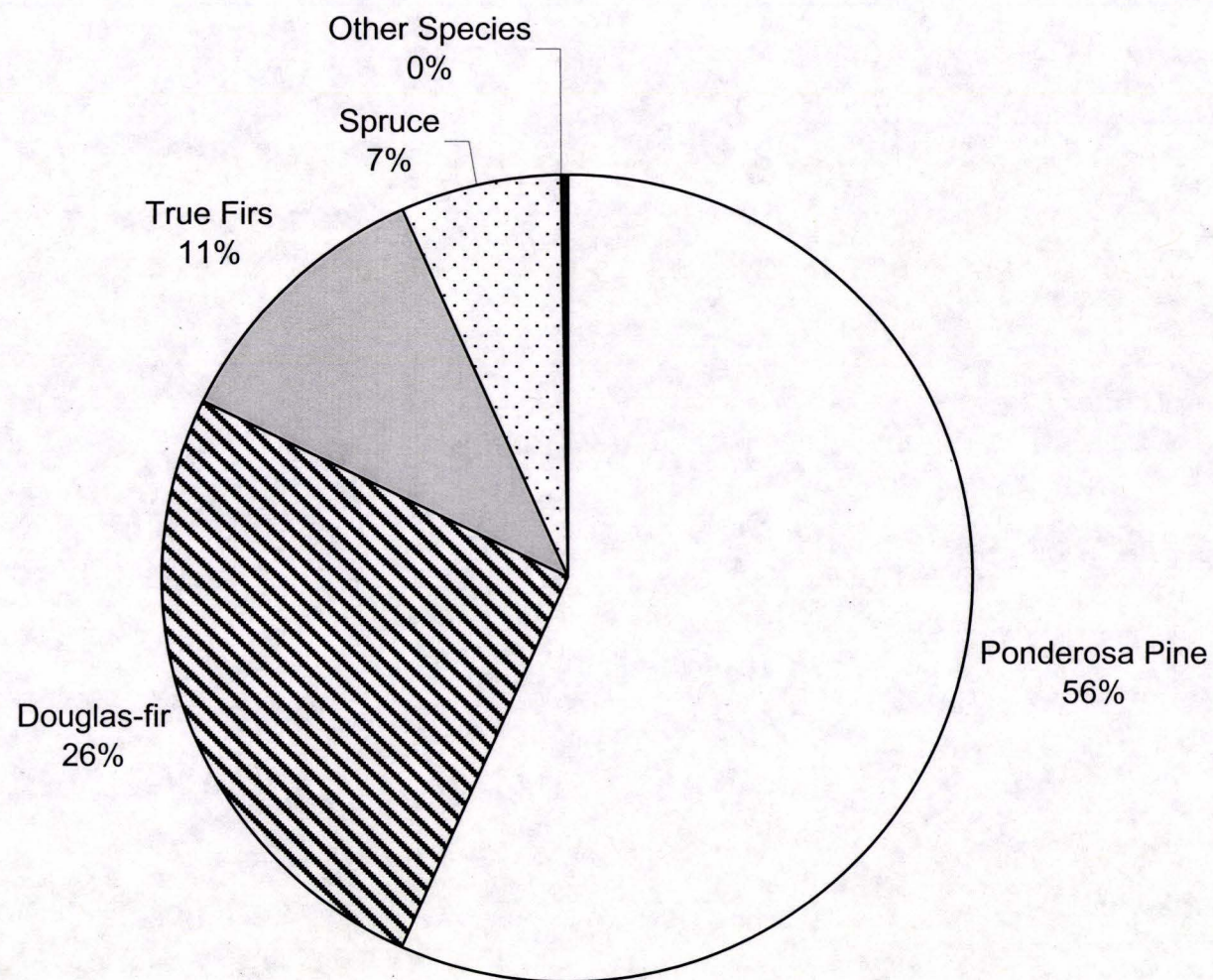
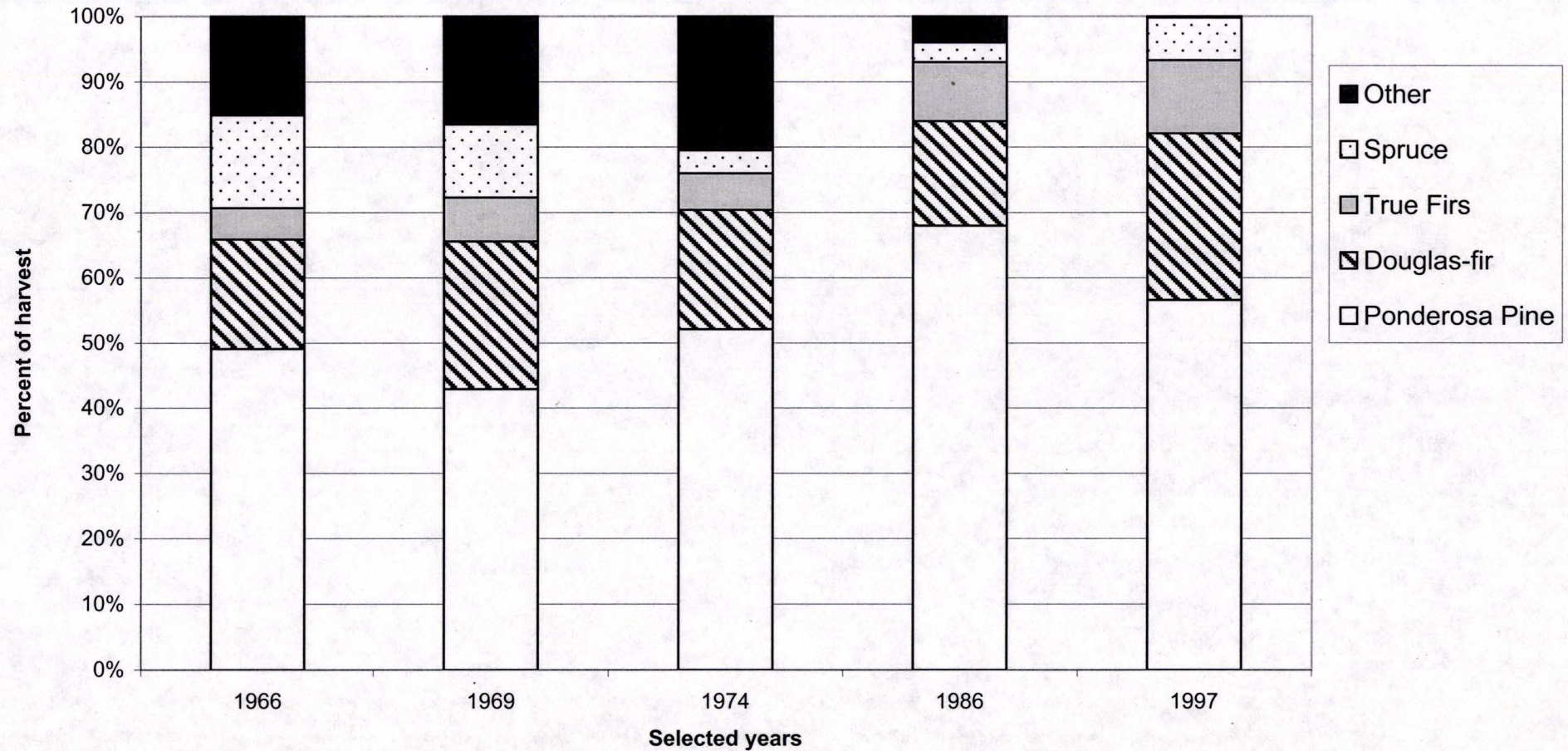


Figure 9
New Mexico Timber Harvest
by Species for Selected Years



Note: The years 1966, 1969, and 1974 include fuelwood harvest--mostly pinyon pine and juniper.

Source: McLain, 1989, New Mexico's Timber Production and Mill Residue, 1986, USDA Forest Service Intermountain Research Station, Resource Bulletin INT-59, Ogden, UT; Setzer and Wilson 1970, Timber Products in the Rocky Mountain States, 1966, USDA Forest Service Intermountain Forest and Range Experiment Station, Resource Bulletin INT-9, Ogden, UT; and Setzer and Barret 1977, New Mexico Timber Production and Mill Residues, 1974, USDA Forest Service Intermountain Forest and Range Experiment Station, Research Note INT-231, Ogden, UT.

Figure 10 - Utilization of New Mexico's 1997 Timber Harvest

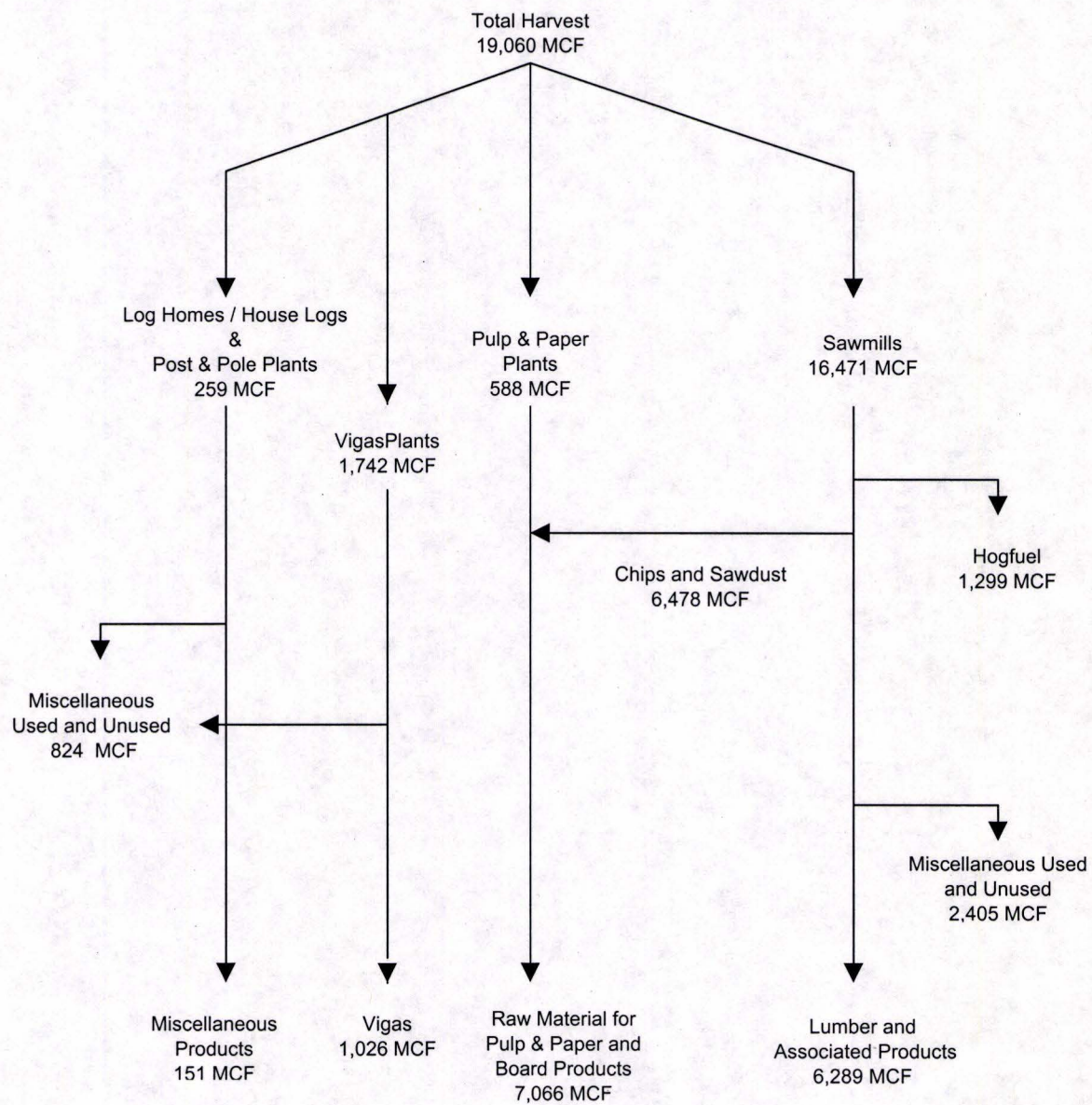


Figure 1

Market Areas for New Mexico's Primary Forest Products

